

that of the Museum of Zoology of the University of Michigan. The one citation was seemingly an acceptance on faith of a distribution census sheet that Walker sent out and which was filled in by Grand Rapids conchologists. The other was a paleontologist's determination, in every likelihood. *M. elevatus* occurs in the extreme corners of Michigan close to the southern boundary line. The indications are that the southwestern colonies represent migrations out of Indiana along the banks of the St. Joseph River. The single known colony at the southeast corner occupies a situation that was joined to the Ohio mainland until the Maumee River changed its course. What remained of the Ohio end of the land projection was inhabited by *M. elevatus* until an oil refinery took it over. The species has been collected in northwestern Ohio only along the Maumee River and its tributaries.

NOTES ON SALASIELLA FROM MEXICO

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This is part 7 of a series on Mexican mollusks collected for Dr. Bryant Walker in 1926. The first part appeared (1928) as Occasional Papers Mus. Zool. Univ. Michigan, no. 193, in which the symbols for localities are explained on pp. 2-25. In plate 6, the small numbers over the scales indicate their lengths in millimeters or fractions; all the figures of shells, genitalia or radulae, with the exception of 5 to 7, have about the same magnification. Those abbreviated labels, which are not explained in the text, are defined in Bull. Bishop Museum 158: 92-93 (1938).

In the following description of the anatomy of the genus *Salasiella*, use is also made of Strebel's (1878, Beitrag 3: 29, pl. 10, f. 1-7) figures of *S. joaquinae*.

Foot elongate; lower pedal groove distinct; tail without mid-dorsal groove; sole narrow, attenuate but rounded posteriad. Mantle collar very broad either side of pedal groove and dorsally, so that pneumostome is distant from anterior wall of lung (Strebel's f. 5), with a broad glandular zone and a narrow anal extension along hindgut (Strebel's f. 4); right mantle-lappet not free; anterior and posterior left ones of medium size and widely separated; umbilical lobe small. Lung wall with indistinct minor venation. Kidney (Strebel's f. 6) with a triangular limb along and longer than pericardium and an exceedingly

attenuate one extending diagonally to hindgut; ureteric opening just short of posterior corner of lung, but continued by broad groove along hindgut.

Ovotestis (G, my f. 6) consisting of few clavate alveoli; talon not evident; carrefour (X) sphaeroid, shallowly imbedded or exposed (small species). Albumen gland (GG) stout. Uterus (UT) attenuate apically; free oviduct (UV) and vagina (V) various; spermathecal sac (S) imbedded above aorta between limbs of first S-loop of hindgut. Prostate (DG) ellipsoid, attached to uterus but with free apical end not reaching uterine apex, along which it appears to be continued by an internal groove. Epiphallus (E) consisting of an apical thin-walled sac, which internally is papillate, and a long thick-walled basal region, which internally is longitudinally plicate; invested terminally by penial retractor and opening into penis through a verge (PV, my f. 7). Penial retractor arising from diaphragm and inserting mainly on penial apex around epiphallus. Penis innervated from cerebral ganglion, with a lateral diverticulum (PL), which contains a pilaster and is solid at tip (PA). Atrium (Y) short, opening shortly behind and above inferior tentacle.

Columellar muscle system with heavy tail-fan practically free, pharyngeal retractor almost so, and two free retractors separating near origin. Free retractors similar to those of *Euglandina sowerbyana* (Strebel, pl. 17, f. 1) but lateral branches slenderer; right ommatophoral muscle in penioviducal angle.

Labial lobes (retracted) fairly large and triangular. Alimentary canal well shown in Strebel's fig. 2; S-loops of hindgut long. Radula with all 23-31 teeth unicuspid and aculeate (but 2nd of *Salasiella* s.s. with broad blade).

Central nervous system similar to that of *Spiraxis* (1939, Naut. 53: pl. 3, f. 9) but cerebral commissure reduced to a constriction and pedal or pleural connectives 2 or 3 times as long as either cerebral ganglion.

SALASIELLA (PERPUSILLA) PERPUSILLA (Pfeiffer), new subgenus
(Pl. 6, figs. 1-4).

This species was collected at Necaxa, altitude 3100-5500 feet (BCD, III, a, 31, 33-35, 41, 52). To my eye, the most salient difference, between *S. perpusilla* and *S. modesta* from Necaxa, is in the larger apical whorls of the former, which also has larger whorls that more widely override preceding ones and render the spire shorter. In addition, *S. modesta* usually has closer growth-striae, which appear shallower because their interspaces are more convex. Both species are very variable in shape, but in shells

of the same length and number of whorls, *S. perpusilla* is usually stouter. Shells of 4 whorls may attain sexual maturity but individuals from stations 41 (f. 3) and 52 develop 5.

Animal (station 33) similar to *S. joaquinae*, but foot and tentacles less pigmented and liver with black pigment between alveoli. Lung about twice as long as its base or kidney length, which is 1.5 pericardium. Ovotestis (G, f. 1) consisting of 5 or 6 alveoli imbedded in basal half of apical liver lobe. Papillate apex of epiphallus (E) about $\frac{1}{3}$ its length. Verge (PV, exposed by excision of penial wall) cylindric. Penial retractor arising near base of prostate; diverticulum short and stout but larger than epiphallie branch. Atrium without demarcated thickening. Radular formula (f. 2): 15-1-15, 65 rows counted; central relatively larger and less remote; all teeth with elongate blades; rows (T shows shape of right half with spacing of teeth marked) V-shaped; entire radula 1.19 mm. long.

The distinguishing characteristics of the subgenus *Perpusilla*, type *S. perpusilla* from Necaxa (station 33, f. 4), are outlined in the following key:

- A. Radula with 45-65 rows of small, slender teeth, which decrease in size from first (less than .033 mm. long) out; vagina short; shell minute.....subgenus *Perpusilla*, new.
- AA. Radula with fewer rows of big teeth (but central reduced and remote), of which second is much the longest (0.33 mm.) and widest; vagina long; shell small.

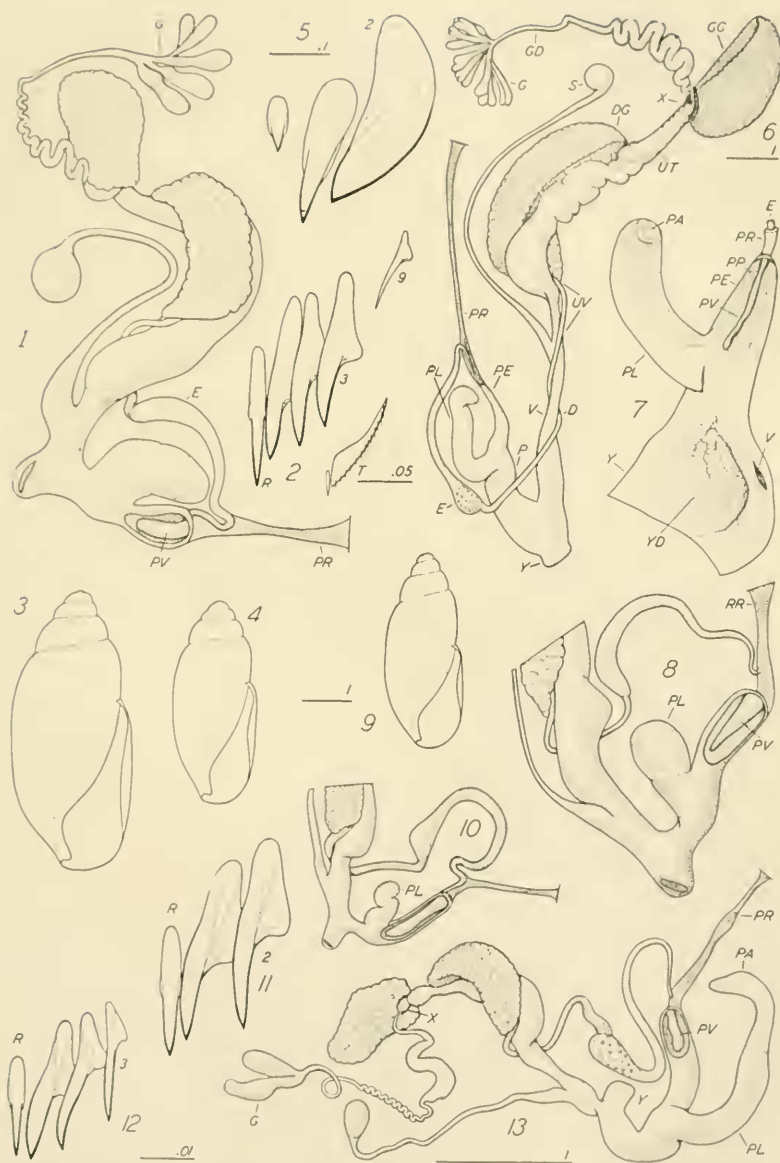
subgenus *Salasiella*, s.s.

| | | Alt. | diam. | alt. ap. | diam. ap. | whorls |
|----------------------|--------|------|----------|----------|-----------|--------|
| <i>S. perpusilla</i> | (S-41) | 5.59 | 43(2.38) | 60(3.38) | 38(1.27) | 5 |
| | (S-33) | 4.12 | 42(1.73) | 60(2.48) | 36(0.89) | 4.6 |
| <i>S. modesta</i> | (S-52) | 3.92 | 40(1.58) | 53(2.06) | 40(0.83) | 4.3 |
| | (S-3) | 3.88 | 39(1.51) | 55(2.13) | 37(0.79) | 4.5 + |

SALASIELLA (P.) MODESTA (Pfeiffer) (Pl. 6, figs. 8-10).

Races of this species were found near Córdoba, alt. 2600-3100 ft. (D, III, a, 3, 4) and around Necaxa, alt. 2600-5500 ft. (BCD, III, a, 33, 34, 52-54). Those from Córdoba have smaller but more whorls than those from Necaxa (f. 9). The differences in genitalia, noted below, may be partly due to divergences in age or contraction.

Animal (station 52) similar to *S. perpusilla*. Left mantle-lappets relatively larger. Lung length almost 2.5 its base or thrice kidney length. Ovotestis with 3 alveoli. Penial diver-



Figs. 1-4, *Salasilla perpusilla*. Figs. 5-7, *S. joaquinae*. Figs. 8-11, *S. modesta*. Figs. 12, 13, *S. minima*.

